

What is claimed is:

1. A digital demodulating device in a digital TV receiver comprising:

a digital signal processor digitalizing pass band signals of a particular channel transmitted in a VSB modulation mode;

a base band demodulator multiplying the pass band digital signals by a complex sinusoidal wave with a recovered carrier wave to convert the pass band digital signals to base band digital signals;

a carrier wave recovery portion detecting phase error of a carrier wave from base band pilot signals output from the base band demodulator, generating a complex sinusoidal wave relative to the phase error, and outputting the complex sinusoidal wave to the base band demodulator;

a resampler interpolating a timing error of current symbols to reduce an error between the base band digital signals output from the base band demodulator;

a matched filter filtering the output of the resampler to maximize a signal-to-noise ratio (SNR) at a symbol position;

a timing recovery portion obtaining a timing error of the current symbols from an output signal of the matched filter and feeding back the timing error to the resampler; and

a channel equalizer compensating channel distortion included in the output signal of the matched filter.

2. The digital demodulating device of claim 1, wherein the carrier wave recovery portion includes:

a frequency phase error detector detecting frequency offset and phase error from the pilot signals included in the base band digital signals output from the base band demodulator;

a loop filter filtering and integrating the output of the frequency phase error detector; and

an NCO generating a complex sinusoidal wave relative to the output of the loop filter and feeding back the complex sinusoidal wave to the base band demodulator.

3. The digital demodulating device of claim 1, wherein the timing recovery portion includes:

a timing error detector detecting timing error information from the output of the matched filter;

a loop filter filtering only low band signal components from the timing error information detected by the timing error detector; and

an NCO converting output frequency in accordance with the low band signal components of the timing error information and controlling sampling timing of the resampler.

4. The digital demodulating device of claim 1, wherein the digital signal processor includes a phase divider dividing the digitalized pass band signal into pass band digital signals I and Q.

5. A digital demodulating device in a digital TV receiver comprising:

a digital signal processor digitalizing pass band signals of a particular channel transmitted in a VSB modulation mode;

a base band demodulating and carrier wave recovery portion multiplying the pass band digital signals by a complex sinusoidal wave with a recovered feedback carrier wave to convert the pass band digital signals to base band digital signals, and recovering the carrier wave from the converted base band digital signals to feed back the carrier wave;

a resampler interpolating a timing error of current symbols to reduce an error between the base band digital signals output

from the base band demodulating and carrier wave recovery portion;

a timing recovery portion obtaining a timing error of the current symbols from an output signal of the resampler and feeding back the timing error to the resampler; and

a channel equalizer compensating channel distortion included in the output signal of the resampler.

6. The digital demodulating device of claim 5, wherein the digital signal processor includes a phase divider dividing the digitalized pass band signal into digital signals I and Q.

7. The digital demodulating device of claim 5, wherein the base band demodulating and carrier wave recovery portion includes:

a base band demodulator multiplying the pass band digital signals by a complex sinusoidal wave with a recovered carrier wave and converting the pass band digital signals to base band digital signals; and

a carrier wave recovery portion detecting phase error of the carrier wave from pilot signals included in the base band digital signals output from the base band demodulator, generating a complex sinusoidal wave relative to the phase error, and feeding back the complex sinusoidal wave to the base band demodulator.

8. The digital demodulating device of claim 7, wherein the carrier wave recovery portion includes:

a frequency phase error detector detecting frequency offset and phase error from the pilot signals included in the base band digital signals output from the base band demodulator;

a loop filter filtering and integrating the output of the frequency phase error detector; and

an NCO generating a complex sinusoidal wave relative to the output of the loop filter and feeding back the complex sinusoidal wave to the base band demodulator.

9. The digital demodulating device of claim 5, further comprising a matched filter disposed between the resampler and the channel equalizer, for filtering the output of the resampler to maximize a signal-to-noise ratio (SNR) at a position of a symbol output from the resampler, wherein the timing recovery portion obtains a timing error of the current symbols using an output signal of the matched filter.

10. The digital demodulating device of claim 9, wherein the timing error recovery portion includes:

a timing error detector detecting timing error information from the output signal of the matched filter;

a loop filter filtering only low band signal components of the timing error information detected by the timing error detector; and

an NCO converting output frequency in accordance with the low band signal components of the timing error information and controlling sampling timing of the resampler.

11. A digital demodulating method in a digital TV receiver comprising the steps of:

a) digitalizing pass band signals of a particular channel transmitted in a VSB modulation mode;

b) multiplying the pass band digital signals by a complex sinusoidal wave with a recovered carrier wave to convert the pass band digital signals to base band digital signals;

c) detecting phase error of the carrier wave from pilot signals included in the base band digital signals, generating a

complex sinusoidal wave relative to the phase error, and feeding back the complex sinusoidal wave to the step b);

d) interpolating a timing error of current symbols to reduce an error between base band digital signals output from the step b);

e) filtering an output signal of the step d) to maximize a signal-to-noise ratio (SNR) at a symbol position;

f) obtaining a timing error of the current symbols from an output signal of the step e); and

g) compensating channel distortion included in the output signal of the step e).

12. The digital demodulating method of claim 11, wherein the step a) includes the step of dividing the digitalized pass band signals into pass band digital signals I and Q.

13. The digital demodulating method of claim 11, wherein the step c) includes the steps of:

detecting frequency offset and phase error from the pilot signals included in the base band digital signals output from the step b);

filtering and integrating the frequency offset and phase error; and

generating a complex sinusoidal wave relative to the integrated frequency offset and phase error and feeding back the complex sinusoidal wave to the step b).

14. The digital demodulating method of claim 11, wherein the step f) includes the steps of:

detecting timing error information from the output of the step e);

filtering only low band signal components of the detected timing error information; and

converting output frequency in accordance with the low band components of the timing error information and controlling sampling timing of the step d).

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